IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A filter having an input and an output comprising:

a capacitor and resistor coupled between the input and the output in a series-feedback path, the capacitor being coupled to the input of the filter, the resistor being coupled to the output of the filter; and

a transconductor to sense a voltage across the resistor to either source or sink additional input current ~~proportional~~ at the input of the filter in proportion to the voltage.

2. (Currently Amended) The filter of claim 1 wherein action of the transconductor and the capacitor are to provide a larger capacitance than the capacitor alone.

3. (Currently Amended) The filter of claim 2 further comprising an amplifier coupled between the input and the output of the filter to receive pulses at the input, wherein the capacitor and resistor are in the series-feedback path of the amplifier, and

wherein the filter is to integrate the pulses and generate a control voltage at the output related to a width of the pulses.

4. (Original) The filter of claim 3 wherein the resistor is to provide a zero for the loop filter, and wherein the larger capacitance is to provide a pole for the filter.

5. (Currently Amended) The filter of claim 4 wherein the capacitor in the series-feedback path is a first capacitor, and wherein the filter further ~~comprising~~ comprises a second capacitor in a parallel feedback path of the amplifier coupled between the input and the output of the filter, wherein the second capacitor is to provide an additional pole of the filter.

6. (Original) The filter of claim 5 wherein a frequency of the additional pole is greater than a frequency of the pole provided by the larger capacitance, and

wherein the first and second capacitors have approximately the same capacitance value.

7. (Currently Amended) The filter of claim 2 wherein the filter is a loop filter for a frequency synthesizer, and

wherein the loop filter is to generate a control voltage for a voltage-controlled oscillator coupled to the output of the filter.

8. (Currently Amended) The filter of claim 3 wherein the filter is a loop filter for a frequency synthesizer, wherein the amplifier is to provide a control voltage for a voltage-controlled oscillator coupled to the output of the filter,

wherein the ~~amplifier is to receive~~ pulses ~~of~~ have varying width and are received by the amplifier from a charge pump coupled to the input of the filter, and

wherein a width of the pulses is approximately proportional to an offset of the voltage-controlled oscillator.

9. (Original) The filter of claim 5 further comprising a filter network at an output of the amplifier to provide a higher frequency pole of the filter.

10. (Currently Amended) A filter having an input and an output comprising:

an operational amplifier having an input coupled to the input of the filter and having an output coupled to the output of the filter; ~~and~~

a feedback path capacitor coupled to the input of the amplifier and in a feedback path of the amplifier; and

a current mirror coupled to the input and the output of the amplifier in ~~a~~ the feedback path of the amplifier to either source or sink additional input current proportional to current through [[a]] the feedback path capacitor,

wherein the current mirror and the feedback path capacitor provide a larger capacitance than the feedback path capacitor alone.

11. (Currently Amended) The filter of claim 10 wherein the feedback ~~a series feedback~~ path comprises the feedback path capacitor and a resistor in series coupled between the input and the output of the amplifier,

wherein the current mirror is part of a transconductor to sense a voltage across the resistor, and

wherein transconductor is to either source or sink the additional input current proportional to the sensed voltage.

12. (Currently Amended) The filter of claim 11 wherein the operational amplifier has a second input that is coupled to a reference voltage and wherein the amplifier is to receive pulses of varying width from a charge pump, and

wherein the filter is to integrate the pulses and generate a control voltage related to the width of the pulses.

13. (Currently Amended) The filter of claim 11 wherein the feedback path is a first feedback path,

wherein the filter further comprises ~~comprising~~ a second capacitor in a ~~parallel~~ second feedback path of the amplifier, the second feedback path being in parallel to the first feedback path,

wherein the resistor is to provide a zero for the filter, wherein the larger capacitance is to provide a pole for the filter,

wherein the second capacitor is to provide an additional pole of the filter, and

wherein a frequency of the additional pole is greater than a frequency of the pole provided by the larger capacitance.

14. (Original) The filter of claim 13 wherein the first and second capacitors have approximately the same capacitance.

15. (Currently Amended) A method comprising:

receiving pulses with an operational amplifier having a capacitor and resistor coupled between an input and an output of the amplifier in a series-feedback path of the amplifier, the capacitor being coupled to the input, the resistor being coupled to the output;

sensing, with a transconductor, a voltage across the resistor to either source or sink additional input current at the input in proportion ~~proportional~~ to the voltage; and

lowering a frequency of ~~providing~~ a pole provided by the capacitor by generating ~~for the filter with~~ a larger capacitance ~~provided by~~ resulting from the either sourcing or sinking current by operation of the transconductor ~~in conjunction with the capacitor~~.

16. (Currently Amended) The method of claim 15 wherein the amplifier, capacitor, resistor and transconductor comprise a filter having an input and an output coupled respectively to the input and the output of the amplifier,

wherein ~~receiving comprises receiving~~ the pulses ~~of~~ have a varying width and are received at the input of the filter, and wherein the method further comprises:

integrating the pulses to generate a control voltage at the output of the filter related to the width of the pulses.

17. (Currently Amended) The method of claim 16 wherein receiving comprises receiving the pulses from a charge pump coupled to the input of the filter,

wherein sensing comprises sensing the voltage across the resistor to either source or sink additional input current for the charge pump,

wherein the method further comprises providing the control voltage to a voltage-controlled oscillator coupled to the output of the filter, and

wherein the width of the pulses is related to an offset of the voltage-controlled oscillator.

18. (Currently Amended) A frequency synthesizer comprising:

a charge pump; and

a loop filter having an input and an output and comprising a capacitor and resistor coupled between the input and the output in a series-feedback path, the capacitor being coupled to the input and the resistor being coupled to the output, wherein an output of the charge pump is

coupled to the input of the loop filter, wherein the loop filter further comprises~~, and~~ a transconductor to sense a voltage across the resistor to either source or sink additional ~~input~~ current at the input of the filter, the additional current being ~~for the charge pump~~ proportional to the sensed voltage,

wherein the transconductor and the capacitor provide a larger capacitance than the capacitor alone.

19. (Currently Amended) The frequency synthesizer of claim 18 wherein the charge pump is to provide pulses of varying pulse width to the loop filter,

wherein the loop filter is to integrate the pulses to generate a control voltage at the output of the loop filter related to the width of the pulses,

wherein the frequency synthesizer further comprises a voltage-controlled oscillator coupled to the output of the loop filter to receive the control voltage from the loop filter and to generate a frequency output, and

wherein the width of the pulses is related to an offset of the frequency output.

20. (Currently Amended) The frequency synthesizer of claim 19 wherein the loop filter further comprises an operational amplifier coupled between the input and the output of the loop filter and having a first input ~~to a reference voltage~~ to receive the pulses from the charge pump and having a second input to receive a reference voltage, and wherein the capacitor and resistor are in the series-feedback path of the amplifier.

21. (Currently Amended) The frequency synthesizer of claim 20 wherein the resistor is to provide a zero for the loop filter, wherein the larger capacitance is to provide a first pole for the filter, and

wherein operation of the transconductor lowers a frequency of the first pole.

~~wherein the loop filter further comprises a second capacitor in a second feedback path of the amplifier,~~

~~wherein the second capacitor is to provide an additional pole of the filter, and~~

~~wherein a frequency of the additional pole is greater than a frequency of the pole provided by the larger capacitance.~~

22. (Original) The frequency synthesizer of claim 20 wherein the frequency synthesizer is a fractional-N frequency synthesizer,

wherein the frequency synthesizer further comprises divide by fractional N circuitry to receive the frequency output from the voltage-controlled oscillator and divide the frequency output by a non-integer value, and

wherein N is a positive odd integer.

23. (Original) The frequency synthesizer of claim 20 further comprising divide by N circuitry to receive the frequency output from the voltage-controlled oscillator and divide the frequency output by N, wherein N is a positive even integer.

24. (Currently Amended) A wireless communication device comprising:

a frequency synthesizer to generate a reference frequency; and

a transceiver to process received radio-frequency signals using the reference frequency,

wherein the frequency synthesizer comprises a charge pump and a loop filter coupled to an output of the charge pump, the loop filter having an input and an output and comprising a capacitor and resistor coupled between the input and the output of the loop filter in a series-feedback path, the capacitor coupled to the input of the loop filter and the resistor coupled to the output of the loop filter, the loop filter further comprising~~, and~~ a transconductor to sense a voltage across the resistor to either source or sink additional input current at the input of the filter, the additional current being ~~for the charge pump~~ proportional to the sensed voltage, and

wherein by operation of the transconductor and the capacitor are to provide a larger capacitance than the capacitor alone.

25. (Currently Amended) The device of claim 24 wherein the charge pump is to provide pulses of varying pulse width to the loop filter, and

wherein the loop filter is to integrate the pulses to generate a control voltage at the output of the loop filter related to the width of the pulses,

wherein the frequency synthesizer further comprises a voltage-controlled oscillator to receive the control voltage from the loop filter and to generate a frequency output,

wherein the width of the pulses is related to an offset of the frequency output, and

wherein the loop filter further comprises an operational amplifier ~~referenced~~ coupled to a reference voltage and coupled between the input and the output of the filter to receive the pulses from the charge pump, and

wherein the capacitor and resistor are in the series-feedback path of the amplifier.

26. (Currently Amended) The device of claim 24 wherein the transceiver comprises a direct down conversion receiver, and wherein the reference frequency comprises a radio frequency signal for use in down-converting received radio frequency signals to signals of substantially zero frequency.

27. (Currently Amended) The device of claim 24 wherein the transceiver comprises a superheterodyne receiver and wherein the reference frequency is a local-oscillator frequency and is used to down-convert a received radio frequency signal to one or more intermediate frequency signals.

28. (Original) The device of claim 24 wherein the transceiver comprises a polar transmitter to generate a phase component from the reference frequency, the phase component to be used to generate a polar-modulated radio frequency signal to transmit a code-division multiplexed communication signal.

29. (Original) The device of claim 24 wherein the transceiver comprises a digital transceiver to transmit phase modulated signals using a phase reference generated from the reference frequency.

30. (Currently Amended) A system comprising:

a substantially omnidirectional antenna to receive radio frequency signals;

a frequency synthesizer to generate a reference frequency; and

a transceiver to either downconvert or upconvert the signals received by the antenna ~~signals~~ using the reference frequency,

wherein the frequency synthesizer comprises a charge pump and a loop filter coupled to an output of the charge pump, the loop filter having an input and an output and comprising a capacitor and resistor coupled between the input and the output of the loop filter in a series-feedback path, the capacitor coupled to the input of the loop filter and the resistor coupled to the output of the loop filter,

the loop filter further comprising~~, and~~ a transconductor to sense a voltage across the resistor to either source or sink additional input current at the input of the filter, the additional current being ~~for the charge pump~~ proportional to the sensed voltage, and

wherein by operation of the transconductor and the capacitor are to function as a larger capacitance than the capacitor alone.

31. (Original) The system of claim 30 wherein the charge pump is to provide pulses of varying pulse width to the loop filter, and wherein the loop filter is to integrate the pulses to generate a control voltage related to the width of the pulses.

32. (Currently Amended) The system of claim 31 wherein the frequency synthesizer further comprises a voltage-controlled oscillator to receive the control voltage from the loop filter and to generate a frequency output, wherein the width of the pulses is related to an offset of the frequency output, and

wherein the loop filter further comprises an operational amplifier ~~referenced~~ coupled to a reference voltage, the amplifier to receive the pulses from the charge pump, and wherein the capacitor and resistor are in the series-feedback path of the amplifier.

Claims 33-35. (Canceled)